



Research Paper

Economics of production and marketing of guava in western Maharashtra

■ V.G. POKHARKAR, S.A. SANGLE AND A.R. KULKARNI

See end of the paper for authors' affiliations

Correspondence to :

A.R. KULKARNI

Department of
Agricultural Economics,
Mahatma Phule Krishi
Vidyapeeth, Rahuri,
AHMEDNAGAR (M.S.)
INDIA

ABSTRACT : The present investigation was undertaken in order to depict the economics of production of guava in Western Maharashtra. The study was conducted to examine resource use pattern, costs and returns in guava. The per hectare cost 'A', cost 'B' and cost 'C' at the overall level, worked out to Rs. 48451.10, Rs.81324.33 and Rs.97168.82, respectively. The major items of cost were rental value of Rs.23332.45 (24.12%) and was followed by hired human labour Rs. 19681.84 (20.25%), family human labour Rs.15844.49 (16.30%), manures Rs. 8139.11 (8.38%) and amortized establishment cost Rs. 8105.02 (8.34%). However, the per hectare cost of cultivation in different size groups of holding was Rs. 101657.57, Rs. 99140.86 and Rs.90707.94 in small, medium and large groups, respectively. The present study was based on the primary data collected from 90 randomly selected guava growers from six villages. Eight independent variables jointly explained the 70 per cent variation in output at the overall level. The production elasticity of human labour (X_1) was significant for small, large and overall level. The production elasticity of bullock labour (X_2) for small, medium and manure use per hectare (X_3) was non-significant for all three size of group indicating excess use of manure. The factor expenses on nitrogen per hectare (X_4) were significant for small, large and overall group indicating positive impact on production of guava. The regression co-efficient of use of phosphorus per hectare (X_5) was non-significant for medium and large size group and significant at small and overall basis indicating positive impact on production of guava. The expense on plant protection (X_6) was found significant at overall level, while the factor expenses on irrigation (X_7) was significant for all groups. The large size group was observed more efficient as compared to small and medium size groups since the B:C ratio was of the high order in large size group. The per hectare yield was highest (188.52 q) in large group followed by medium (181.27 q) and small (110.45 q). At the overall level, the per hectare yield was 160.08 quintals. The average per hectare gross return of guava was Rs.132567.29, Rs.140020.97 and Rs.147395.86 to small, medium and large groups, respectively. In the process of marketing channels viz., producer - pre-harvest contractor - wholesaler - retailer - consumer was observed to be the most popular. The channel wise per quintal cost of marketing was highest (Rs. 286.34) for channel-I followed by channel-II (Rs. 228.23) and channel-III (Rs.165.65). The channel wise price spread was worked out and the marketing margins worked out for channel- I, II, III. The price paid by consumer per quintal was highest (Rs.1199.26) in channel-I and lowest (Rs.557.71) in channel-III. The channel wise price spread was worked out and the marketing margins worked out for channel- I, II, III. The maximum net price received by producer in channel-I (Rs.514.66) and minimum in channel-III (Rs.398.26).

KEY WORDS : Guava, Resource use pattern, Cobb-douglas, Price spread

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INTRODUCTION :

India has been a predominantly an agrarian economy since a time immemorial. The developmental efforts over the last few decades have been doubtlessly strengthened our industrial base. Guava (*Psidium guajava* L.) belong to family Myrtaceae, the apple of tropics, has been cultivated in India since early 17th century and is one of the most common fruits in India. It is now cultivated all over the tropics and sub tropics. It is a native of tropical America, In India it is successfully grown in Karnataka, Uttar Pradesh, Bihar, Madhya Pradesh, Maharashtra, West Bengal, Orissa and Tripura.

Guava is cultivated in almost all the districts of Maharashtra state. The predominant guava growing districts are Satara, Beed, Pune, Ahmednagar, Aurangabad and Amravati. In Maharashtra, area under guava in 2011-2012 was 37000 hectares with production of 3,22,000 metric tonnes and its productivity was 7.9 Mt/Ha (Database of NHB 2012 Ministry of Agril. Govt of India). India has made a fairly good progress in production of fruits with a total production of 76,424 metric tonnes in the year 2011-12, against 28,632 metric tonnes during 1991-92 (Database of NHB 2012, Ministry of Agril. Govt. of India).

Mishra *et al.* (2000) conducted a study on production and marketing of banana in Gorakhpur district of Uttar Pradesh. The researchers worked out the total per hectare cost of production of banana on small, medium and large farms at Rs.36,281.50, Rs.37,820.50 and Rs.38,447.50, respectively, with average cost of Rs.37,516.50 per hectare. Per hectare average gross returns were Rs.71,133.33, which was higher on large farms (Rs.73,400) followed by medium farms (Rs.72,250) and small farms (Rs.67,750). The average input output ratio was 1: 1.89.

Anonymous (2001) studied economics of production and marketing of banana in Jalgaon district of Western Maharashtra. The study concluded that, cost of cultivation of banana was Rs.133477.36 and the gross returns per hectare of banana came to Rs.214867.24 and net returns of Rs. 66761.87. Rane and Bagade (2006) studied economics of production and marketing of banana in Sindhudurg district of Maharashtra. The study revealed that the per hectare cost at cost C in Dodamarg and Sawantadi tahsil were Rs.1.52 lakhs and Rs.1.53 lakh, respectively. In Dodamarg tahsil banana was grown as a sole crop where per hectare cost of cultivation was Rs.1.28 lakh and in Sawantadi tahsil the per hectare cost

was Rs.1.15 lakh. The benefit cost ratio in Dodamarg tahsil and Sawantadi tahsil were 2.20 and 2.33, respectively. The average cost ratio of banana cultivation was 2.27.

Objectives :

- To estimate resource use, cost and returns structure and resource use productivity in guava.
- To examine the marketing practices and pattern of disposal in marketing of guava.
- To estimate the marketing cost and price spread of guava.

MATERIALS AND METHODS :

The Ahmednagar district was purposively selected. The area under guava is concentrated in Rahata, Shrirampur and Kopargaon tahsils of Ahmednagar district. Therefore, these three tahsils were selected on the basis of maximum area under guava. The techniques like tabular analysis, arithmetic mean and ratio were used to analyze the data. For that standard cost concept of cost-A, cost- B and cost- C were used.

Selection of growers and villages :

Ninety farmers from Ahmednagar district were selected from three tahsils *viz.*, Rahata, Shrirampur and Kopargaon. The guava growers were classified in three groups on the basis of area under guava orchard. Thirty guava growers in each group were selected for the study. Five samples from each size group in a village were selected randomly (Table A). Thus, fifteen samples from each village were selected. The total samples were 90 (30 small, 30 medium and 30 large). The data for the present study obtained by survey method in a pretested schedule containing details about area under guava crop, capital investment, cost of cultivation and production were collected from the selected growers by personal interviews for the year 2010-11.

Marketing cost :

Total cost incurred on marketing by producer and by various intermediaries involved in sale and purchase of commodity till the commodity reaches the ultimate consumer.

Marketing margin :

It refers to difference between the prices prevailing

Table A : Distribution of sample farmers				
Sr. No.	Tahsils and villages	Small (0.01-0.20 ha)	Medium (0.21-0.40 ha)	Large (0.41 ha and above)
1.	Shrirampur			Total
	Takali Bandh	5	5	15
	Bhokar	5	5	15
2.	Rahata			
	Ekrukhe	5	5	15
	Sakuri	5	5	15
3.	Kopargaon			
	Sangawi Bhusar	5	5	15
	Deradi Chandad	5	5	15
		30	30	90

as successive stages of marketing at a given point of time.

Price spread :

Price spread refers to difference between the price paid by the consumer and the prices received to the producer for an equivalent quantity of farm product. It includes all market charges incurred by producer, wholesaler, retailer as well as profit margin of wholesaler and retailer. Information about expenses incurred by producer, wholesaler and retailer was collected and analyzed to estimate price.

Functional analysis :

The data on production of guava was analyzed with the help of Cobb - Douglas type of production function. The form of the function used in the present study was of following type:

$$Y = aX_1^{b_1}X_2^{b_2}X_3^{b_3}X_4^{b_4}X_5^{b_5}X_6^{b_6}X_7^{b_7}X_8^{b_8}e^t$$

where,

Y = Output (q)/ha.,

X₁ = Human labour (mandays)ha.

X₂ = Bullock labour (pair days) /ha ,

X₃ = Manure(qt)

X₄ = Nitrogenous fertilizer (kg/ha),

X₅ = Phosphatic fertilizer (kg/ha)

X₆ = Potassic fertilizer (kg/ha),

X₇ = Plant protection charges (kg/ha)

X₈ = Irrigation charges (kg/ha)

a= Constant,

e= Error term, bi's=Regression co-efficient.

RESULTS AND DATA ANALYSIS :

The information given in Table 1 makes it clear that per hectare resource use of bullock labour is highest in small size group (12.41 pair days) and lowest in medium

Table 1 : Resource use levels of guava cultivation (Per ha.)				
Sr. No.	Particulars	Small	Medium	Large
1.	Total human labour (days)	262.63	228.01	195.28
	Male	152.19	119.46	108.24
	Female	110.44	108.55	87.04
2.	Bullock power (pair days)	12.41	2.53	8.08
3.	Machine power in (hrs)	8.64	12.24	22.58
4.	Manures (q)	45.14	67.87	50.32
5.	Fertilizers (kg)			
	N	35.20	68.53	44.42
	P	68.91	124.03	91.77
	K	51.03	125.16	75.02
6.	Irrigation charges (Rs.)	6271.43	7330.32	3752.60
7.	Plant protection charges (Rs.)	3303.14	2359.68	2628.38

size group (2.53 pair days). Total human labours were highest in small group (262 man days) and lowest in large group (195 man days). The machine power use was observed higher in large size group (22.58 hours) and lowest in small size group (8.64 hours). The manure use was more in medium size (67.87q) and lower in small size group (45.14 q).

Cost of establishment of guava orchard :

The primary data from the guava growers were compiled and tabulated suitably. The various items of cost incurred from the beginning of plantation till the orchard reaches economic bearing stage are under establishment cost. The different items contributing to the establishment cost are given in Table 2.

In order to work out the annualized establishment cost the total establishment cost of gestation period have been apportioned over 35 years which is considered to be economic life of guava orchard. The per hectare establishment cost for small, medium and large and overall group was Rs. 42,180, Rs.44,210, Rs.46,890 and Rs. 44,426.67, respectively.

Cost of cultivation of guava :

The cost of cultivation of guava includes fixed cost and working cost. The cost of production mainly influenced by the relationship between output and inputs. The yearly expenses incurred on the maintenance of bearing garden such as utilization of all material inputs, human labour, bullock power, machine power and all imputed cost are included in this cost.

At the overall level, amongst the different items of

cost, rental Value of land was the highest Rs.23,332.45 (24.12%). The other important items of cost were hired human labour Rs. 19,681.84 (20.25%), family human labour Rs.15,844.49 (16.30%), manures Rs. 8,139.11 (8.38%), amortized establishment cost Rs.8,105.02 (8.34%), irrigation cost Rs. 5,784.78 (5.95%), fertilizers cost Rs. (3.06%), interest on working capital Rs.2,866.61 (2.94%), plant protection Rs.3,763.73 (2.84%) bullock labour Rs. 2,685.28 (2.76%) and machine power Rs.1,861.37 (1.92%). Interest on fixed capital had negligible share Rs.1,435.76 (1.48%).

The cost 'A' was Rs. 48,451.10 (49.86%) and cost B was Rs. 81,324.33 (83.69%). As regards these items the similar trend was observed among different size groups. The cost 'C' was minimum in large size group followed by medium and large size group. The cost 'A' was maximum in medium group Rs.52,876.13, followed by Rs.52,544.80 in large size and Rs.39,932.36 in small size groups, respectively. The cost 'B' was Rs.71,697.85, Rs.85,923.12 and Rs. 86,352.01 for small, medium and large groups, respectively. While total cost i.e., cost 'C' was Rs.1,01,657.67, Rs. 99,140.86 and Rs. 90,707.94 for small, medium and large groups, respectively. It could be revealed from the above discussion that pattern of cost on various items of cost of cultivators of guava was declining over the different size group of holdings. It indicates economies of scale.

The per hectare net profit at cost A' was highest (Rs.94,851.06) in large group followed by small group (Rs.92,634.93) and medium group (Rs. 87,144.97). At the overall level it was (Rs. 91,543.60). The net returns at cost C was highest in large group (Rs.56,687.92),

Table 2 : Establishment cost of guava orchard

Sr.No.	Operation	Size group of holding			(Rs./ha)
		Small	Medium	Large	Overall
1.	Preparation of land	3000 (7.11)	3400 (7.69)	3500 (7.46)	3300 (7.43)
2.	Drilling and filling of pits	1946 (4.61)	2020 (4.57)	2150 (4.59)	2038.67 (4.59)
3.	Seedling cost	4170 (9.89)	4210 (9.52)	4350 (9.28)	4243.33 (9.55)
4.	Transplanting cost	834(1.98)	880 (2.00)	950 (2.03)	888 (2.00)
5.	Manures and fertilizers	14820(35.13)	15220 (34.43)	16250 (34.65)	15430 (34.73)
6.	Irrigation charges	2325 (5.51)	2440 (5.52)	2560 (5.46)	2441.67 (5.50)
7.	Interculturing charges	4100(9.72)	4300 (9.72)	4450 (9.49)	4283.33 (9.64)
8.	Land revenue and cesses	390 (0.92)	450 (1.02)	470 (1.00)	436.67 (0.98)
9.	Depreciation and repairs	77 15 (18.29)	8230 (18.62)	9010 (19.22)	8313.23 (18.72)
10.	Interest on working capital	2880 (6.84)	3060 (6.92)	3200 (6.82)	3046.67 (6.86)
	Total expenditure	42180 (100.00)	44210 (100.00)	46890 (100.00)	44426.67 (100.00)

(Figures in parentheses indicate percentage to total)

followed by medium group (Rs.40,880.11) and small group (Rs.30,909.62), respectively. At the overall level it was Rs.42,825.88. The per hectare net profit increased at increasing size of group (Table 3).

At the overall level B:C ratio was 1.49. The B:C ratio was highest in large size group (1.62), followed by medium group (1.41) and small group (1.30), respectively. From the above Table 4 it is indicated that per unit cost of cultivation is declining as size group increases and that

results in to the more (1.62) profitability in large size group.

Results of Cobb –Douglas type of production function :

It means that if the plant protection charges increased by 1 per cent, the output would increase by 0.15 per cent. The regression co-efficient of N fertilizer (X_4) and irrigation charges (X_8) was significant at 5 per

Table 3 : Cost of cultivation of guava

Table 3 : Cost of cultivation of guava											(Rs./ha)		
Sr. No.	Cost items	Size group									Overall		
		Small			Medium			Large					
		Qty	value	%	Qty	value	%	Qty	value	%	Qty	value	%
1.	Hired human labour												
	Male	37.23	7446.43	7.33	71.35	14270.97	14.39	89.96	17992.49	19.84	82.29	13236.63	13.62
	Female	40.75	4075.00	4.00	72.58	7258.06	7.32	80.03	8002.57	8.82	75.47	6445.21	6.63
2.	Bullock labour (days)	12.41	4341.88	4.27	2.53	886.29	0.89	8.08	2827.67	3.12	7.43	2685.28	2.76
3.	Machine hrs.	8.64	948.18	0.93	12.24	1625.81	1.64	22.58	3010.12	3.32	19.58	1861.37	1.92
4.	Seed (kg)			00			00			00			00
5.	Manures (q)	45.14	6450.00	6.34	67.87	10303.23	10.39	50.32	7664.11	8.45	53.07	8139.11	8.38
6.	Fertilizer (kg)												
	N	35.20	452.32	0.44	68.53	880.60	0.89	44.42	570.74	0.63	48.02	634.55	0.65
	P	68.51	1181.19	1.16	124.03	2125.80	2.14	19.77	1572.89	1.73	95.73	1626.63	1.67
	K	51.03	368.94	0.36	125.16	904.92	0.91	75.02	542.42	0.60	82.13	605.63	0.62
7.	Irrigation charges (Rs.)		6271.43	6.17		7330.23	7.39		3752.60	4.14		5784.78	5.95
8.	Biofertilizers+ Weedicide (Rs.)		146.43	0.14		200.65	0.20		166.48	0.18		171.91	0.81
9.	Working capital (Rs.)		36875.66	36.27		49108.27	49.53		49112.06	54.14		45032.00	36.34
10.	Int.on working Capital @6%		2212.54	2.18		2946.50	2.97		2946.72	3.25		2701.92	2.78
11.	Depr.on farm implements (Rs.)		765.63	0.75		749.50	0.76		414.86	0.46		643.33	0.66
12.	Land revenue and other taxes		78.53	0.08		71.86	0.07		71.16	0.08		73.85	0.08
13.	Cost- A (Rs.)		39932.36	39.28		52876.13	53.3		52544.80	57.93		48451	49.68
	Rental value of land		22094.55	21.73		23336.82	23.54		24565.98	27.08		23332.45	24.12
14.	Int.on fixed capital @ 10 %		1406.58	1.38		1416.70	1.43		1484.01	1.64		1435.76	1.48
15.	Amortization cost		8264.36	8.13		8293.47	8.37		7757.72	8.55		8105.02	8.34
16.	Cost- B (Rs.)		71697.85	70.53		85923.12	86.67		86352.01	95.20		81324.33	83.69
17.	Family labour (days)												
	Male	114.96	22991.07	22.62	48.10	9620.97	9.70	18.27	3654.94	4.03	31.56	12088.99	12.44
	Female	69.69	6968.75	6.86	35.97	3596.77	3.63	7.01	700.99	0.77	17.36	3755.50	3.86
18.	Output												
	Main produce (q)	110.45	132567.29		181.27	140020.97		188.52	147395.86		160.08	139994.7	
	Bye-produce (q)	0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00	
19.	Cost- C		101657.6			99140.86			90707.94			97168.82	
20.	Per quintal cost (Rs./q)		920.40			546.92			481.16			649.49	

(Figures in parentheses indicate percentage to total)

cent level of significant, indicating positive impact on production of guava. The bullock labour (X_2), P fertilizer (X_5) and K fertilizer (X_6) was non-significant.

In case of large size group, human labour (X_1), N (X_4) and P (X_5) fertilizers, plant protection charges (X_7) and irrigation charges (X_8) was significant at 5 per cent level of significant which indicating all these inputs have positive impact on production of guava. The regression co-efficient of bullock labour (X_2), manure (X_3) and P fertilizer (X_5) was non-significant indicating excess use in production of guava.

At overall level, the regression co-efficient of N (X_4) and K (X_6) fertilizers was significant at 1 per cent level. It means increase in use of nitrogen and potassium fertilizer, output would increase by 0.22 and 0.03 per cent, respectively. The regression co-efficient of human labour

(X_1), plant protection charges (X_7) and irrigation charges (X_8) was significant at 5 per cent level. The bullock labour (X_2), manure (X_3) and P fertilizer (X_5) was non-significant. It was indicating excess use of these inputs in production of guava.

Marketing channels :

Marketing channels state that how produce passes through different agencies from producers till it reaches to the final consumer. It is essential to point out different marketing channels in the guava marketing. Following were important marketing channels in the guava marketing observed during the study.

Channel –I: Producer –Pre-harvest contractor – wholesaler – retailer –consumer

Channel –II: Producer – retailer –consumer (district

Table 4 : Per hectare profitability of guava production

					(Rs./ha)
Sr. No.	Operation	Size group of holding			Overall
1.	Total cost	Small	Medium	Large	
	Cost 'A'	39932.36	52876.13	52544.80	48451.10
	Cost 'B'	71697.85	85923.12	86352.01	81324.33
	Cost 'C'	101657.67	99140.86	90707.94	97168.82
2.	Profit at				
	Cost 'A'	92634.93	87144.97	94851.06	91543.60
	Cost 'B'	60869.44	54097.85	61043.85	58670.37
	Cost 'C'	30909.62	40880.11	56687.92	42825.88
3.	Production (q)	110.45	181.27	188.52	160.08
4.	Gross returns	132567.29	140020.97	147395.86	139994.70
5.	B:C ratio				
	Cost 'A'	3.32	2.65	2.81	2.99
	Cost 'B'	1.85	1.63	1.71	1.78
	Cost 'C'	1.30	1.41	1.62	1.49

Table 5 : Results of Cobb –Douglas type of production function

Sr. No.	Particulars	Size group of holding			Overall
		Small (n=30)	Medium (n=30)	Large (n=30)	
1.	R ²	0.62	0.68	0.64	0.70
2.	Constant (a)	1.3887	2.2487	0.1993	2.2887
3.	Human labour (mandays) (X_1)	0.1938 [*] (0.0992)	0.4413 ^{***} (0.1604)	0.8451 ^{**} (0.3315)	0.0762 ^{**} (0.0300)
4.	Bullock labour (days) (X_2)	0.731 ^{NS} (0.0494)	0.2037 ^{NS} (0.1785)	0.0895 ^{NS} (0.0977)	0.450 ^{NS} (0.0408)
5.	Manure (q) (X_3)	0.637 ^{NS} (0.1282)	0.0185 ^{NS} (0.0981)	0.0027 ^{NS} (0.1257)	0.0645 ^{NS} (0.0461)
6.	Fertilizers N (X_4)	0.2200 ^{**} (0.1058)	0.0840 ^{**} (0.0299)	0.3885 ^{**} (0.1811)	0.2200 ^{***} (0.0619)
	P (X_5)	0.1455 ^{**} (0.0567)	0.2051 ^{NS} (0.1747)	0.1718 ^{NS} (0.1800)	0.1605 ^{**} (0.0607)
	K (X_6)	0.2984 ^{***} (0.1008)	0.0194 ^{NS} (0.0278)	0.0929 ^{**} (0.0329)	0.0309 ^{***} (0.0108)
7.	Plant protection (Rs.) (X_7)	0.0603 ^{NS} (0.0732)	0.1577 ^{***} (0.0475)	0.1277 ^{**} (0.0529)	0.0550 ^{**} (0.0251)
8.	Irrigation (Rs.) (X_8)	0.3498 ^{***} (0.1213)	0.2305 ^{**} (0.1028)	0.3663 ^{**} (0.1580)	0.5830 ^{**} (0.2443)

^{*}, ^{**} and ^{***} indicate significance of values at P=0.01, 0.05 and 0.1 respectively

NS= Non-significant

and nearby market)

Channel –III: Producer – consumer (local sale).

Per quintal cost of marketing through different channels of guava :

The per quintal marketing cost of guava for different channel is presented in Table 6. It can be seen from Table 6 that, the per quintal cost of marketing of guava for channel I, channel II and channel III was Rs.286.34, Rs.228.232 and Rs.165.65, respectively. Thus, the per quintal cost of marketing was highest in channel I which contain pre-harvest contractor and was major channel in the study area. Among the marketing cost transport and commission charges were the major items and contributed highest share (70.59%) and (12.39%), respectively for channel I. For the channel II transport and hamali charges were the major items contributing 79.06 per cent and 11.52 per cent, respectively. Transport and packaging charges were the major items contributed in the channel III.

Price spread in different marketing channels :

Price spread refers to the difference between the price paid by the consumer and price received by the

producer. This consists of marketing costs and margins of the different channels. The costs and margins of each agency in different channels were workout and the details are presented in Table 7.

From Table 7, it can be revealed that the marketing expense incurred to producer was only in channel III, which is local sale by grower. The net price realized by the producer's ranges from 398.26 to 514.66 in different channels. The per cent share of producers in consumers rupees was highest in channel III (71.43%) followed by the channel II (44.81%) and channel I (42.91%). This is due to fact as the market chain increases producers share in consumer rupees decreases. The price paid by the consumer was highest in channel I and lowest in channel III due to vicinity of production centre.

Conclusion:

The per hectare cost 'A', cost 'B' and cost 'C' at the overall level, worked out to Rs. 48451.10, Rs. 81324.33 and Rs. 97168.82, respectively. The major items of cost were rental value of Rs. 23332.45 (24.12%) and was followed by hired human labour Rs. 19681.84 (20.25%), family human labour Rs. 15844.49 (16.30%), manures Rs. 8139.11 (8.38%) and amortized establishment cost

Table 6 : Channel wise marketing cost of guava

Sr.No.	Particulars	Channel-I	Channel-II	Channel-III
1.	Grading	16.46 (5.75)	14.22 (3.23)	0 (0.00)
2.	Packaging charges	5.99 (2.09)	7.28 (3.19)	10.13 (6.12)
3.	Transport	202.12 (70.59)	180.44 (79.06)	155.52 (93.88)
4.	Commission agent	35.48 (1.39)	0 (0.00)	0 (0.00)
5.	Hamali	26.29 (9.18)	26.29 (11.52)	0 (0.00)
6.	Total marketing cost	286.34 (100.00)	228.23 (100.00)	165.65 (100.00)

(Figure in the parentheses is percentages to the marketing cost)

Table 7 : Price spread in different channels of guava

Sr. No.	Particulars	Channel- I		Channel- II		Channel- III	
		Rs.	%	Rs.	%	Rs.	%
1.	Price received by producer	514.66	(42.91)	478.52	(44.81)	398.26	(71.43)
2.	Expenses incurred by the producer					159.25	(28.57)
3.	Net price realized by producer	514.66	(42.91)	478.52	(44.81)	557.51	(100.00)
4.	Expenses incurred by the pre-harvest contractor (including harvesting charges)	586.34	(48.89)	528.23	(49.47)	0.00	(0.00)
5.	Expenses incurred by the whole-saler	25.24	(2.10)	0.00	(0.00)	0.00	(0.00)
6.	Margin of the wholesaler	15.30	(1.28)	0.00	(0.00)	0.00	(0.00)
7.	Expenses incurred by the retailer	32.35	(2.70)	34.68	(3.25)	0.00	(0.00)
8.	Margin of the retailer	25.37	(2.12)	26.44	(2.47)	0.00	(0.00)
9.	Price paid by the consumers in the market	1199.26	(100)	1067.87	(100)	557.71	(100)

(Figures in the parentheses are percentages to the final price paid by the consumer)

Rs. 8105.02 (8.34%). However, the per hectare cost of cultivation in different size groups of holding was Rs. 101657.57, Rs. 99140.86 and Rs. 90707.94 in small, medium and large groups, respectively.

The per hectare yield was highest (188.52 q) in large group followed by medium (181.27 q) and small group (110.45 q). At the overall level, the per hectare yield was 160.08 quintals. The average per hectare gross return of guava was Rs. 132567.29, Rs. 140020.97 and Rs. 147395.86 to small, medium and large groups, respectively. The per hectare gross return was Rs. 1,39,994.70 at overall level. The per hectare net profit at the total cost was highest to large group (Rs. 56687.92) and it was Rs. 42825.88 at overall level. Eight independent variables jointly explained the 70 per cent variation in output was at the overall level. The production elasticity of human labour (X_1) was significant for small, large and overall level.

The production elasticity of bullock labour (X_2) for small, medium and large sized holdings was non-significant. The factor expenses on manure use per hectare (X_3) was non significant for all three size of group indicating excess use of manure. The factors expenses on nitrogen per hectare (X_4) were significant for small, large and overall group indicating positive impact production of guava. The regression co-efficient of use of phosphorus per hectare (X_5) was non-significant for medium and large size group and significant at small and overall basis indicating positive impact on production of guava. The expense on plant protection (X_7) was found significant at overall level, while the factor expenses on irrigation (X_8) was significant for all groups. Related to the present investigation, the studies have also been carried out on economic analysis of production of guava from different regions by various research workers (Chinnapa and Rammana, 1997; Khushk, 2009; Awasthi *et al.*, 1987 and Kakadia *et al.*, 1999).

On overall basis 98.80 per cent quantity marketed while rest of the quantity was used for consumption, given as gratis to others and losses due to cracking, sunburn, pest and disease etc. In the process of marketing, the marketing channels *viz.*, producer - pre-harvest contractor - wholesaler - retailer - consumer was observed to be the most important. The channel wise per quintal cost of marketing was highest (Rs. 286.34) for channel-I followed by channel-II (Rs. 228.23) and channel-III (Rs. 165.65). The channel wise price spread was worked out and the marketing margins worked out for channel- I, II, III. The

price paid by consumer per quintal was highest (Rs. 1199.26) in channel-I and lowest (Rs. 557.71) in channel-III. The maximum net price received by producer in channel-I (Rs. 514.66) and minimum in channel-III 398.26). The per cent of net realized was maximum in channel-III (71.43%) and minimum in channel - I (42.91%). Related to the present investigation the studies have also been carried out on economic analysis of different fruits in different regions by various research workers Begum and Raha (2002) and Patil (2005) in banana; Chavan (2004); Khunt (2003); Pujari (1998) and Sonawane (2008) in pomegranate; Dangat *et al.* (1989) and Waykar and Kadam (1992) in Ber and Pagire and Deshpande (2007) and Pokharkar (1996) in Ber.

Authors' affiliations:

V.G. POKHARKAR AND **S.A. SANGLE**, Department of Agricultural Economics, Mahatma Phule Krishi Vidyapeeth, Rahuri, AHMEDNAGAR (M.S.) INDIA

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